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ABSTRACT

This action research project was designed to improve faculty knowledge of hearing loss and its effects on education at two Illinois elementary schools. Sixty-nine faculty members participated in the project. Methods of assessment of faculty knowledge included a survey, questionnaire, document analysis, and anecdotal records of informal conversations. The intervention involved a staff development workshop, monthly newsletters focused on specific aspects of hearing impairment, and one-on-one assistance when needed. The effectiveness of the inservice and newsletters was measured by comparison of pre- and post-intervention surveys and questionnaires. Results from the questionnaire indicated that the faculty at both sites increased their knowledge. Also, faculties at both sites reported favorable attitudes toward the intervention and felt their knowledge had increased. Seventeen appendices include the pre- and post-intervention surveys and questionnaires, results of document analysis, an outline of the inservice, inservice handouts, the newsletters, and data analysis tables. (Contains 29 references.) (DB)

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IMPROVING FACULTY KNOWLEDGE OF HEARING LOSS AND ITS EFFECTS ON EDUCATION

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An Action Research Project Submitted to the Graduate Faculty of the

School of Education in Partial Fulfillment of the

Requirements for the Degree of Master of Arts in Teaching and Leadership

Saint Xavier University & SkyLight

Field-Base Master's Program

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ABSTRACT

The action research project was designed to improve faculty knowledge of hearing loss and its effects on education at the targeted elementary schools located in a northwestern suburb of Illinois. The study was conducted from September through January 2003 and included 69 participants (31 faculty members at Site A and 38 at Site B). Methods of assessment to document faculty knowledge of hearing loss included a survey, questionnaire, document analysis, and anecdotal records of informal conversations. The survey was used to gather information about participants' professional background and personal experience with hearing loss. A two-part questionnaire targeting five categories of hearing loss was used to assess faculty knowledge. The document analysis provided data regarding the prevalence of students with hearing loss at each site. Anecdotal records were taken from faculty to record informal conversations and written feedback concerning students with hearing loss to note their ability to observe and report the indicators and effects of hearing loss.

A review of the literature revealed the increase in students with hearing loss (Holden-Pitt & Diaz, 1998), the increase of classroom noise (Anderson, 2001), the faculties limited knowledge and training (Luckner & Denzin, 1998), and the lack of sufficient time for meaningful consultation (Luckner, 1991) effect faculty knowledge of hearing loss and how it impacts on learners. The document analysis and preintervention assessment revealed that the faculties at both sites had limited knowledge about the increased prevalence of hearing loss and how to effectively meet the needs of student with hearing loss in their classrooms.

According to Pillai (1997), general education teachers must understand the needs of students with hearing loss. Dodd-Murphy and Mamlin (2002) suggested strategies to assist general educators in identifying students with hearing loss, implementing effective listening strategies in the classroom, and improving environmental accommodations. To improve the faculties' knowledge, researchers provided inservice training to faculties at the targeted elementary schools and created a monthly newsletter highlighting a different category of hearing loss in each.

Effectiveness of the inservicing and newsletters was measured by comparison of preintervention and postintervention surveys and questionnaires. The faculties at both sites reported favorable attitudes toward the intervention and felt their knowledge had increased. Results from the questionnaire indicated that the faculty at both sites improved their knowledge. The researchers intend to continue to provide inservices and newsletters in the future to other schools.

SIGNATURE PAGE

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

The faculty members in the targeted elementary schools exhibited a low awareness regarding the prevalence of hearing loss and its effects on learning in kindergarten through fifth grade. The problem was evidenced through a survey, questionnaire, and observations involving anecdotal records of informal conversations with faculty members. Additional evidence was gathered by a document analysis of existing school records which included students' health concerns and hearing assessments, those previously identified with hearing loss, and written comments from teachers. The purpose of this action research was to explore the extent of low awareness among faculties in the participating schools and to identify possible solutions for increasing their knowledge and support to learners experiencing hearing loss.

Immediate Problem Context

The problem was examined in two elementary school buildings located in a northwestern suburb approximately 45 miles outside a major city. The two elementary buildings, referred to as Site A and Site B, are located within the same town. Site A and Site B are located on the east and west side of a major river respectively. Information reported was gathered from district's school report cards of 2001.

Site A is a kindergarten through fifth grade building with approximately 512 students enrolled for the 2002-03 school year. Of this enrollment, 90.9% are White, 4.3% are Hispanic, 1.3% are Black, and 3.5% are Asian or Pacific Islanders. The average class size is 27 students. The school has a 96.0% attendance rate with a mobility rate of 11.9%. The school contains 8.7% of its students in the low income range. Students with limited English proficiency make up 2.0%.

Site A is serviced by 53 faculty and staff members. There is a building principal, an assistant principal, 20 classroom teachers, and four special education resource teachers who have 15.5 years of teaching experience on average. The percentage of teachers holding a master's degree is 75%. The school also has nine certified staff members in the areas of physical education, music, media center, literacy (a leader and a teacher), speech/language pathology, school social work, and school psychology. In addition, students are served by eight certified itinerant teachers in the areas of gifted education, band, orchestra, occupational therapy, physical therapy, inclusion facilitating, vision, and hearing. The remaining staff members are secretaries, teacher aides, lunch and playground supervisors, custodians, and a health aide.

Site A is a newly constructed kindergarten through fifth grade school building which opened in the Fall 2002. The school is located in a quiet residential area adjacent to its feeder middle school. The main office in the building has attached offices for the principal, assistant principal, nurse, and also includes a conference room. It has 17 regular education classrooms, six special education classrooms, and offices for support staff including the psychologist, social worker, occupational and physical therapists, speech/language pathologists, hearing itinerant, literacy teacher, and teacher of gifted students. The building also contains a media center with an attached computer laboratory, gymnasium, auditorium, cafeteria, and faculty lounge. A newly constructed play area is located next to the school. The school is brightly lit and is decorated with primary colors throughout.

Site B is a kindergarten through fifth grade building with approximately 688 students enrolled for the 2002-03 school year. The student population is comprised of 90.8 % White, 1.4% Black, 4.3% Hispanic, 2.8% Asian/Pacific Islander, and 0.7% Native American. Site B has a 96.5% attendance rate and 6.5% mobility rate. Students from families in the low income range make up 2.8% of the population. The site has 2.0% of students that have a limited English proficiency. Average class size at this site is 24 students.

Site B has 69 faculty and staff members including: administrators, certified teachers in regular and special education, literacy teachers, support staff, teacher and student assistants, office personnel, a school nurse, and custodians. There are 31 classroom teachers who have an average of 10 years experience. The percentage of teachers holding a master's degree is 45%. There are six certified staff members in the areas of music and physical education. Services are also provided by an inclusion facilitator, two speech/language pathologists, a social worker, psychologist, hearing itinerant, English as a second language specialist, computer/media lab teacher, and a gifted facilitator.

Site B is located within a residential neighborhood and has been operating as an elementary facility since 1977. A main office contains the principal's, assistant principal's, and nurse's offices. There are 26 regular education classrooms and five special education rooms. Four small offices are utilized by the school's psychologist, social worker, speech language pathologist, and other support service personnel. A multipurpose room is used for band, orchestra, physical education, music, and a variety of large group meetings. The building also has a large gymnasium, media center, computer lab, faculty lounge, small professional library, cafeteria, and a large playground adjacent to the building. The hallways are tiled and classrooms are carpeted. In the summer of 2002, new windows were added to 11 classrooms. The school is brightly decorated with school colors and proudly displays the school mascot.

Students attend classes from 8:10 a.m. to 2:30 p.m. at both sites. Core subjects taught include mathematics, science, English and social science. The schools spend 74 minutes per week on mathematics instruction, 18 minutes per week on science, 167 minutes per week on English, and 18 minutes per week on social science. In addition, students receive 60 minutes per week in each of the following: physical education, music, and media instruction. Staff members at Site A and Site B actively participate in professional development opportunities provided by the school district. They then implement newly learned best practices into their classrooms including: Quantum Learning, cooperative grouping, guided reading, and character education. Both sites participate in the community's police provided Drug Awareness Resistance Education (D.A.R.E.) program and also provide a variety of after school enrichment opportunities.

Sites A and B have hearing itinerant teachers responsible for the provision of direct and consultative services for students with hearing loss and support for staff working with them. They also monitor the hearing health and academic progress of students who have failed school administered hearing tests. The number of students followed by the hearing itinerants varies from year to year. During this research project Site A had one student receiving direct hearing itinerant services, two receiving consultative services, and three additional students being monitored. Site B had one student receiving direct services and 23 students being monitored by the hearing itinerant teacher.

The Surrounding Community

Sites A and B are located within a community unit school district that has 23 schools, 16 elementary buildings and seven secondary buildings. Four of the elementary buildings were newly constructed for the 2002-03 school year, including Site A. The district encompasses 118 square miles and serves students from nine villages and a small portion of five other cities. The total enrollment in the district is 17,194 students. The student population is 74.4% White, 19.0%

Hispanic, 4.0% Black, 2.1% Asian American, and 0.5% Native American. The attendance rate in the district is 94.5%. The graduation rate is 88.3%.

The district employs a total of 953 teachers of which 23.9% are men and 76.1% are women. The teachers are 94.7% White, 0.6% Black, 4.0% Hispanic, 0.3% Asian, and 0.3% Native American. The average years of teaching experience in the district is 12.8 years. Teachers holding a bachelor's degree make up 48.7% and teachers with a master's degree or above make up 51.3%. The average district teacher's salary is $50,376.00.

The area surrounding the targeted schools is a rapidly growing suburban area covering 10.17 square miles. The population is approximately 23,276 people. This number has more than doubled in the past 10 years. The 2000 Census reported that 91.6% of the population is White, 0.8% is Black, 4.1% is Hispanic, and 2.3% is Asian. The median age of the residents is 33.6 years. The majority of homes in this area are single family homes with the average price of $219,775. The area also has many townhouses and carriage homes with the average cost of $119,866. There are low levels of crime and unemployment within the community. There has been a recent growth in commercial, industrial, and retail businesses. The community has a public library and numerous public parks that include family recreation and picnic areas. The area has eight churches of seven different faiths, three have private schools attached serving students in grades kindergarten through eighth grade.

The recent population growth in the community has resulted in an increase of traffic, particularly during peak commuting hours. The area has become extremely congested and increasingly difficult to navigate. Possible solutions to alleviate the traffic problems have included creating a new bypass to cross the river. The placement of this has been heavily debated in community politics.

National Context of the Problem

The number of children with hearing loss being educated in their local schools has increased over the past 20 years (Holden-Pitt & Diaz, 1998). This means that more classroom teachers now have the responsibility of making the necessary accommodations for these students to learn. Yet, most regular education teachers do not have the experience, nor are they provided with the training to identify and implement effective strategies to meet the needs of this population (Luckner & Denzin, 1998).

There are 39.5 million students in the United States, and approximately eight million have some type and degree of hearing loss (Flexer, 1995). A hearing loss occurs when there is a malformation, injury, infection, illness, or degeneration to any or all parts of the hearing system. The ear is divided into three main sections: outer ear, middle ear, and inner ear. Each section is comprised of parts that work together as a system to complete the process known as hearing. A hearing loss can be partial or total, temporary or permanent, in one or both ears. Hearing loss varies in type and degree and can significantly effect the development of speech, language, communication, learning, behavior, and social skills. There are three types of hearing loss: conductive hearing loss, sensorineural hearing loss, and mixed hearing loss. A conductive hearing loss results from the interference with or damage to the outer or middle ear structures. Common causes of this type include malformation of, injury to, or absence of the structures. Other causes are blockage due to ear wax or middle ear infections. Often conductive hearing loss can be corrected medically or surgically; however, it can be recurring and result in permanent hearing loss. A sensorineural loss of hearing results from the malfunction or damage to the inner ear structure. Common causes include heredity, illness, noise, degeneration, or destruction by ototoxic medications. This type of hearing loss cannot be treated medically and is permanent. Mixed hearing loss is the combination of both conductive and sensorineural components.

Hearing loss can be unilateral, effecting one ear, or bilateral, effecting both ears. The degree of loss can also vary for each ear. The degrees of hearing loss are slight, mild, moderate, severe, and profound.

The trend over the past 20 years has shown a decrease in students with profound hearing loss and an increase in students with slight to mild losses (Holden-Pitt & Diaz, 1998). The reason for the growth in the population of students with hearing loss is the increase in numbers of ear infections. Ear infection, or otitis media, is an inflammation in the middle ear often with fluid (effusion), which can cause conductive hearing loss. Otitis media is the most common medical diagnosis for children. In 1992, otitis media accounted for 20.8 million doctor visits for children under the age of 15. The increase in the number of ear infections can be attributed to the growing number of children in daycare where they can easily catch colds and viruses that lead to ear infections (Mason, 1995). In some cases, the infection clears, but the fluid and hearing loss remain. This effusion, or fluid, can last for several weeks or even months. In 25-50% of the cases the child has no symptoms except the loss of hearing. This hearing loss can occur as a decline within the normal hearing range to moderate degrees of impairment (Gravel,1996).

Due to this increase in the hard-of-hearing population, classroom teachers need to be made aware of how the hearing loss effects listening and learning, the listening demands they place on students, and the environment in which listening occurs.

The difficulties experienced by learners with hearing loss are easily misunderstood. It is more often a case of mishearing than not hearing at all. Flexer (1995) described hearing loss as an "invisible acoustic filter" that distorts, smears, or eliminates incoming sounds, especially from a distance. Flexer noted that children with hearing loss can be unaware that they have misheard or not heard a message. When teachers ask a child with hearing loss, "Did you hear me?" the child will often respond, "Yes." Flexer (1995) also stated that the problem with having a hearing loss

is that "you don't hear what you don't hear, and you don't know that you didn't hear it, because you didn't hear it" (p. 54).

Since listening is more difficult for students with hearing loss, it is important to note that listening is an integral part of any school day. Crandell and Smaldino (2001) reported that school children can spend as much as 60% of the school day engaged in listening activities for learning. Teachers need to understand that students with hearing loss will experience more fatigue when being asked to listen attentively for over half of the school day (Crandell & Smaldino, 2001).

As important as the skill of listening, is the environment in which it takes place. To address the needs of students with hearing loss in a classroom environment, the standard recommendation is preferential seating in the front of the classroom. This solution can be ineffective due to background noise, sound proximity to the student, and the mobility of the classroom teacher.

Noise is present in classrooms all the time and can vary tremendously throughout the day. Background noise can significantly affect student attention, behavior, and achievement (Anderson, 2001). Noise can occur from within the classroom, within the school but outside the classroom, and outside the building. Noise from classrooms can include talking, humming lights, overhead projectors, and ventilation systems. Internal noises within the school can include sounds from adjacent classrooms, hallway traffic, bathrooms, cafeterias, and gymnasiums. Outside the building, noise from street traffic, air traffic, construction, and the playground filter in through open windows. All of these noises negatively impact teachers and students. Teachers must speak louder and students must put forth more listening effort (Anderson, 2001). For students with hearing loss, listening is a challenging task in a quiet environment. It is considerably more challenging with the competition of background noise.

Students are required to obtain auditory information from other areas of the room. Their seat in the front of the room is not necessarily "preferential" to where the sound is coming from. This can include responses from other students, movies shown, loudspeaker announcements, or any unstructured activity where the student chooses his or her own seat. Students with hearing loss must be in close proximity to the auditory signal to ensure their best comprehension.

Preferential seating also assumes the teacher instructs and directs from the front of the classroom. Teachers typically do not remain in one spot. Unless students with hearing loss can remain close to the teacher, they will not receive an intelligible speech signal. Therefore, their understanding of what is being discussed is compromised (Flexer, 1995).

There are many factors working against the success of students with hearing loss in regular education classrooms. Hearing loss impacts the acquisition of language which can lead to difficulties in other academic areas. Spoken language and its visual representation in reading and writing are often considered as the main ingredient for classroom success (Pillai, 1997). Students with hearing loss often perform below average in tasks related to language, reading, and communication. They may also present with social and behavioral concerns (Flexer, 1995). In order to be successful in a regular education classroom, students with hearing loss may need support and development in the skills they are lacking.

Students with hearing loss in regular education programs are supported by hearing itinerant teachers. These teachers work with students in preschool through high school, and travel between schools, cities, towns, and districts (Yarger & Luckner, 1999). The goal of a hearing itinerant program is to provide support and service to students with hearing loss and the faculty and staff responsible for educating them. The reality is that time constraints do not always permit adequate consultation to occur. Solutions must be explored to best meet the needs of all those involved to ensure the success of the most important factor, the student.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

In order to document faculty members' knowledge of hearing loss and its effects on learning, researchers administered preintervention/postintervention surveys and questionnaires to a total of 69 participants, conducted a document analysis, and recorded observations in anecdotal records at two sites.

Data collection began after informed consent was gathered at both sites. The researchers set up three separate dates for data collection and intervention with site administrators. The first date was designated for the administration of the preintervention survey and questionnaire. Participating faculty members were instructed to anonymously code their papers to ensure that the same participants completed the postintervention at a later date (Appendix D). The faculties completed a survey which reported their personal experience with hearing loss and a rating of their knowledge of categories pertaining to hearing loss (Appendix A). While questions one through four were optional, as they were of a personal nature, all participants willingly answered. The remaining two questions were designed to determine if they have or had students who receive hearing itinerant services and if they have had previous inservice training from a hearing itinerant teacher. Teachers then used a rating scale of one to four to rate their self perceived knowledge of five categories pertaining to hearing loss and its effects on learning.

Table 2.1
Faculty Survey of Personal Experience with Hearing Loss

	Site A		Site B	
Response Items	Yes	No	Yes	No
Has hearing loss	3	28	2	36
Wears hearing aid	-	31	-	38
Family/friend with hearing loss	20	11	20	18
Knows contact	30	1	37	1
Has/had student with hearing services	19	12	23	15
Received inservice training	5	26	7	31

N= 69 (n_a= 31 n_b= 38)

Participants were asked to provide information about their background experience with hearing loss. Responses, shown above, indicated that teachers had similar experiences at both sites. Very few participants had personally experienced hearing loss, however the majority had known or taught someone with hearing loss.

Participants were asked to rate their knowledge of five categories pertaining to education of students with hearing loss: (1) prevalence, (2) accommodations, (3) effects, (4) indicators, and (5) listening environment. The majority of participants reported their knowledge of the prevalence of hearing loss as very low or low and remaining categories as low or average. A small percentage rated their knowledge of all categories as high. A summary of participants' responses at both sites are presented in Figures 2.1 (p. 12)

Participants completed preintervention questionnaires which consisted of true/false questions related to hearing loss (Appendix B and C). Figure 2.2 (p.13) shows the results.

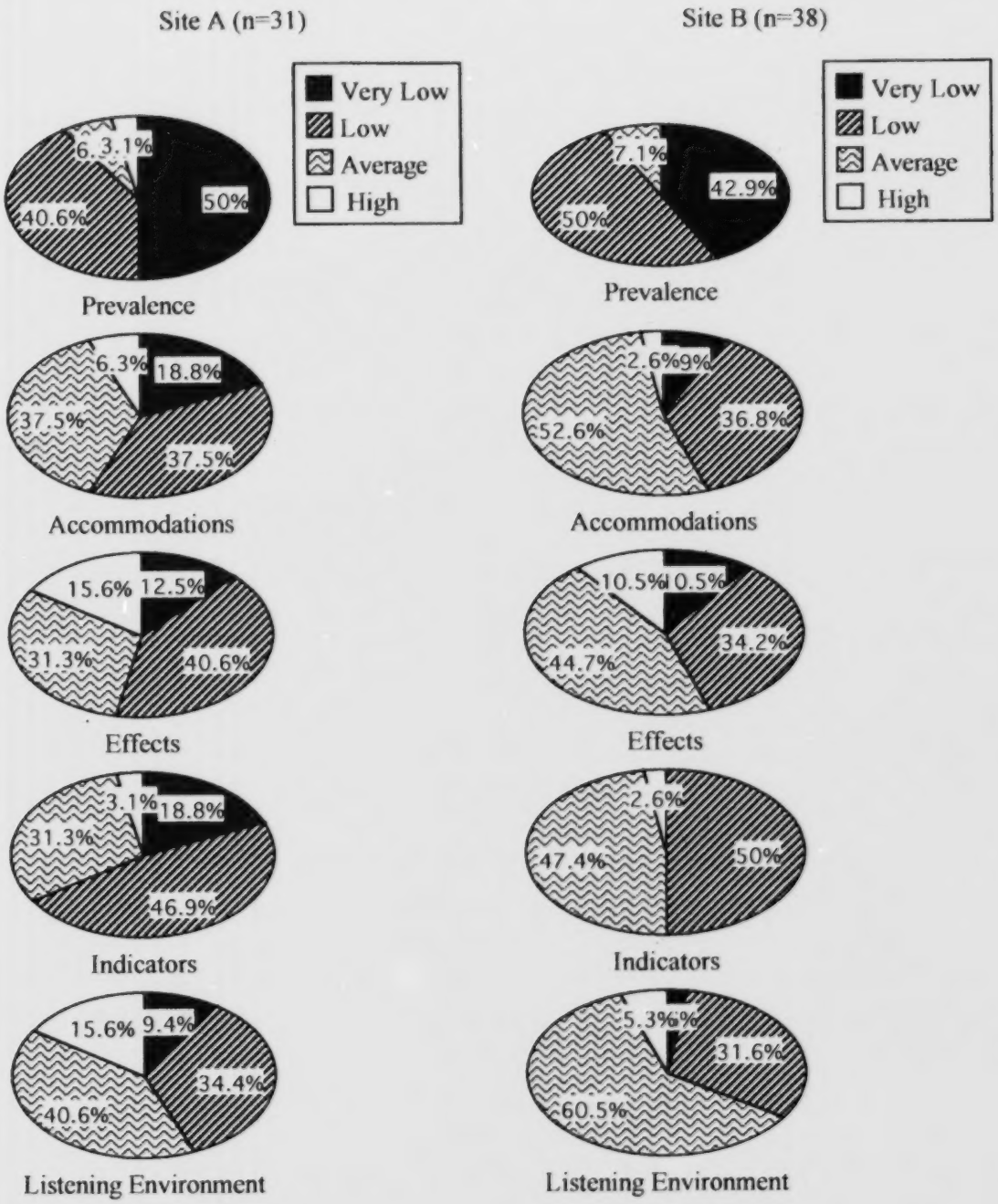

Figure 2.1 Participants' self-reported knowledge by category at Sites A and B

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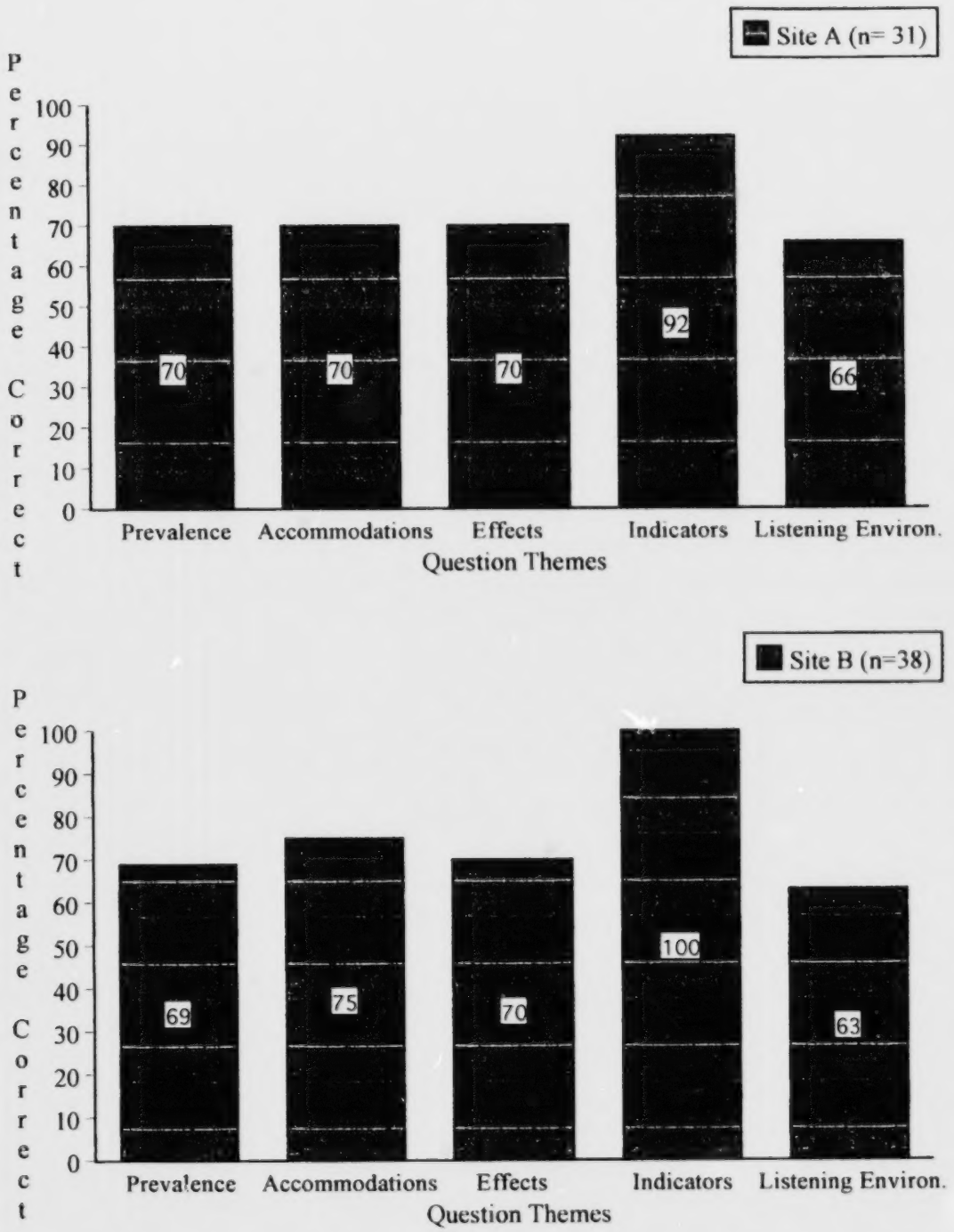

Figure 2.2 Participants' percentage of questions correct in five themes at Sites A and B

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As previously noted in Figure 2.2 data represents participant performance on twenty questions (five related to prevalence, five to accommodations, four to listening environments, three to indicators, and three to effects) related to hearing loss. Based upon the evidence, the participants at both sites had similar knowledge in all categories. They scored an average of 74.5% correct.

Document Analysis

Documents were analyzed at Sites A and B in September. The itinerant teachers for students with hearing loss annually compile a list of students who have failed hearing tests within the past two years. This was used to identify the number of students with hearing loss at each site. Seven of 512 students were identified at Site A and 23 of 688 at Site B.

A confidential list of health concerns compiled from health records by school nurses are distributed to teachers for their reference. At Site A, the list reported 54 students with current or past history of hearing loss. At Site B, students with hearing concerns are no longer included.

During the school year, nurses test the hearing of all students in kindergarten, first, second, third, as well as all special education students. Evaluation forms are sent to teachers to document academic and social progress when students fail school hearing tests. Testing at Site A revealed three previously identified students failed, but no additional students were identified. Therefore no academic information was requested of teachers by the itinerant teacher. Site B had seven new students identified by testing and comments from completed evaluations were included as anecdotal records.

Anecdotal Records

Anecdotal records were compiled at both sites and a review of these records revealed a need for staff to gain an understanding of indicators, accommodations, and good listening environments, as well as the social implications of the hearing loss. The following anecdotes are representative of the misunderstandings evident among the faculties.

An evaluation of student performance was returned stating the student in question had trouble paying attention, following directions, answering questions, often did not respond when spoken to, and often asked for repetition. The section of the evaluation that asked about the listening and hearing abilities was marked no concerns.

A conversation revealed a teacher providing preferential seating to a student with a unilateral hearing loss by placing him where his impaired ear was closest to the teacher. The teacher mistakenly believed that this was the better placement reasoning that the poorer ear would need to be closer so that the student would be able to gain what he could from his poorer ear and then also hear from his better ear. Another teacher placed a student for preferential seating in the front of the classroom, but with the student's back to the teacher.

On three separate occasions teachers shared that they had loud voices, so students would have no trouble hearing and understanding in their classrooms. Other observations included comparisons of students with hearing loss to students with other disabilities, and statements as follows: "I know he or she can hear me," or "I asked the student if he or she heard me and he or she said yes they could."

When speaking to a teacher regarding a student with hearing loss in their class, the teacher spoke of having previous experience with students with hearing loss and that his/her knowledge of sign language would be used to assist the student's understanding. The teacher was reminded that the student did not know or use sign language.

The social implications of having a hearing loss can often be neglected. A conversation with another teacher revealed a student asked his teacher to see his hearing itinerant teacher during the classroom Halloween party. The teacher initially felt the student was manipulating the situation, but after consultation realized that background noise during unstructured classroom activity was creating stress for the student.

Probable Causes

Researchers observed that the targeted faculties have limited knowledge of hearing loss and its effects on student learning. Limited knowledge is an area of concern due to the increase in the numbers of students with hearing loss in the regular education setting. Luckner and Denzin (1998) reported that general education teachers have limited training or experience in working with students experiencing hearing loss. Teacher preparation programs and professional development opportunities generally do not address and provide adequate training for teachers to educate students with hearing loss. Teachers need to be trained to understand and accommodate these students. Without the provision of appropriate training, most teachers are unaware of the prevalence, indicators, identification, and characteristics of students with hearing loss. Until this knowledge is gained, teachers are unaware of how to appropriately accommodate those students in their classrooms. Teachers of students with hearing loss are the best resource to provide information and suggestions. The hearing itinerant teacher faces the challenge of meeting the needs of faculties and students in multiple buildings. Time constraints and multiple job responsibilities often impact the availability of the hearing itinerant teacher to be effective in consultation with the regular education staff.

Prevalence

A review of the literature revealed that the number of students with hearing loss has increased in the regular education setting. National surveys conducted by Gallaudet University spanning thirty years were examined to identify trends among students with hearing loss. Holden-Pitt & Diaz (1998) found that over the years the numbers of students with severe and profound hearing losses has decreased and number of students with minimal, mild, and moderate hearing losses has increased. This increase in minimal and mild hearing loss has resulted in an educational shift from students attending specialized programs to the inclusion of these students

in regular education. Students with lower levels of permanent hearing loss and those experiencing conductive fluctuating hearing losses need educational consideration.

A significant cause of the increase in minimal, mild, and moderate hearing loss among school age children is the increase of the incidence of ear infections. Risk factors for ear infections include attendance in group daycare and exposure to secondhand smoke (Gravel,1996). Gravel also reported that ear infections are the most common finding at doctor visits for children under the age of 15. Children experiencing ear infections are likely to be experiencing some level of impaired hearing ranging from slight to moderate. Ear infections can also cause great pain and discomfort which can interfere with a students ability to concentrate in school. A Phonic Ear Incorporated publication (1994) reported that ear infections are responsible for five million absences from school annually. Many factors including colds, sinus infections, allergies and ear wax build up can cause impaired hearing and often can go undetected. Dodd-Murphy & Mamlin (2002) reported that a school population could have as many as nine percent of students affected with some degree of hearing loss, which could account for a student in every classroom. At Site A approximately 46 students could be affected with some degree of hearing loss and at Site B approximately 62 students. The number of students actually identified at both sites is not consistent with these approximations.

Identification and Indicators

School districts, in this state, are mandated to conduct hearing screenings for students in kindergarten, first, second, and third grades, all special education students, and students with previously identified hearing losses This is the first step in identification of students within the school setting. Unfortunately, this process does not guarantee that all students experiencing hearing loss at varying times are identified. Factors that contirbute to the effectiveness of this process are, the time of year testing occurs, the nature of the hearing loss, and testing conditions.

Dodd-Murphy & Mamlin (2002) stated, "Limitations of school hearing screening programs make it imperative for teachers to take action when they notice behaviors or physical symptoms that could point to the presence of hearing loss" (p.88). There are many indicators of hearing loss and regular education teachers can be the first to identify those students experiencing hearing loss. Teachers need to know the indicators to look for and be careful not to overlook the possibility that hearing loss could be the problem. Hearing loss can often be mistaken for inattention or non-compliance. At Sites A and B researchers have observed classroom teachers making such statements as: "I know he/she hears me" or "he/she is just not paying attention." Teachers are often unaware that hearing loss could be responsible for the problems students are experiencing in their classrooms.

Characteristics of Students With Hearing Loss

Students with hearing loss learn differently than their hearing peers (Das & Ojile, 1995). There are many aspects of the learner with hearing loss that classroom teachers need to know to help these students participate and be successful in school. Each student with hearing loss is unique and the accommodations necessary for one may not be the same as for another.

Students with hearing loss, often experience delayed acquisition of language and vocabulary, reduced incidental learning, frequent and significant academic delays, and most often limited reading abilities (Nelson, 2001). Language is the base on which other skills are acquired and built. Learning is dependent on the student's ability to understand speech (Dodd-Murphy & Mamlin, 2002). Students with hearing loss often miss verbally presented information and are unaware of what they have not heard (Flexer, 1995). Further, the student with hearing loss may misunderstand the message and respond inappropriately to the teacher's question, but appropriately to their perception of the question (Pillai, 1997). Students with hearing loss must attempt to fill in the information that was missed or misheard. This is a complex process which

is dependent upon the students language skills and experience. As previously noted are areas of delay for students with hearing loss.

Inability to hear and comprehend auditory input can lead to frustration in the student with hearing loss. This can often cause behaviors interpreted to be problematic in the classroom setting. Behaviors typically seen include withdrawing from and avoidance of difficult listening situations. These behavioral components in turn effect the student's social relationships with peers and often a negative self-esteem results.

Classroom Listening Environment

Many classroom factors can effect the listening environment and create barriers to learning, especially for those students with hearing loss. Anderson (2001) reported that noise is present in classrooms all the time. Even an empty classroom is noisy. Sources of noise include: ventilation systems, poor insulation that allows noise in from other rooms, hallway and playground noise, hard surfaces that reflect instead of absorb noise, and external noise that enters through open windows like traffic and airplanes. Anderson (1999) reports that the ability to listen in the presence of competing background noise is a skill not developed until approximately the age of 13. Students with hearing loss have a difficult time listening and comprehending when background noise is present. They need to have a favorable listening environment to be successful (Nelson, 2001).

Accommodations for Students With Hearing Loss

Although teachers may think their classrooms and teaching styles are appropriate for students with hearing loss, they are often unaware that some strategies used or routines participated in are actually detrimental to these students. Teachers' perceptions of appropriate accommodations in reality often falls short of meeting the needs of students with hearing loss.

Preferential seating has been the standard recommendation for accommodating students with hearing loss. It is intended to be the placement of these students in the front of the classroom close to the sound source. At Sites A and B, students with hearing loss are placed on a "preferential seating list" distributed to teachers to inform them that those students' hearing losses should be taken into account when seating arrangements are made. Although this accommodation has its purpose, it can be ineffective due to background noise, sound proximity to the student, and the mobility of the classroom teacher (Flexer, 1995). In both sites it has been reported that "they sit up front" but observation revealed that students are required to obtain auditory information from other areas of the room. Their seat in the front of the room is not necessarily "preferential" to where the sound is coming from. Sounds can include responses from other students, movies shown, loudspeaker announcements, or any unstructured activity where the student chooses his or her own seat. Students with hearing loss must be in close proximity to the auditory signal to ensure their best comprehension.

Classrooms have become much more interactive with current best teaching practices including cooperative learning (Anderson, 1999). This typically involves a structured activity that requires groups of four to five students to work together toward a common goal; while each student is responsible for a certain portion of the activity. The philosophy behind cooperative learning states that learning is a social process, and the best way for children to learn is through dialogue. The success in cooperative learning is based on communication skills, which challenges the student with hearing loss on many levels (Caissie & Wilson, 1995). Cooperative learning not only requires them to rely on language and communication skills to participate, it also increases the level of competing classroom noise making listening a difficult task.

Another commonly used classroom practice is playing background music during independent work time. While music has benefits including its calming effects and improved

concentration for some, it creates competing background noise which interferes with the ability of the student with hearing loss to understand verbal communication occurring simultaneously.

Teachers may create difficult listening situations for students with hearing loss in other unintentional ways. They may use high level language that is difficult for the student with hearing loss to understand. They may not repeat answers or comments given by other students that the student with hearing loss did not hear. Teachers also may use a phrase, such as, "I am only going to say this once" which discourages the student from asking for much needed repetition and places unnecessary stress on that student.

There are many factors that can benefit or challenge a student with hearing loss. Teachers may be more cognizant of these things in one environment, but forget to carryover that knowledge to other settings or situations. They may also overestimate their own knowledge and generalize previous experiences that are not appropriate to their current situations.

Collaboration Time

The teacher of students with hearing loss is relied upon to assist regular education teachers in making appropriate adaptations and accommodations concerning the students with hearing loss (Luckner & Denzin, 1998). This may include asking the regular education teacher to change the manner in which instruction is commonly delivered, such as, asking the teacher to stop walking around the room while give instructions because it interferes with speechreading. If the classroom teacher does not or cannot accept or implement advice, the student with hearing loss is at a distinct disadvantage. Researchers have experienced this reluctance to implement an accommodation that is designed solely for the student with hearing loss. Antia, Stinson, & Gaustad-Gonter (2002) conclude that regular education teachers are more willing to make accommodations that benefit all, as opposed to those that benefit one or few.

While collaboration is an essential part of the hearing itinerant teacher's job, it is only one of the many duties they perform. A major barrier to collaboration is the time factor. Yarger and Luckner (1999) interviewed ten itinerant teachers of students with hearing loss and found that seven of the ten reported that they did not have adequate time to consult with regular education teachers. Not only do itinerants face a challenge finding time to collaborate, they also lack formal training in consultation skills (Luckner, 1991).

As indicated in the literature, the number of students with hearing loss has increased. This is due in part to the increase in chronic ear infections resulting in fluctuating hearing loss. These students are educated in regular education programs by classroom teachers who lack specific knowledge, training, and experience in educating this population. Teachers are unaware of the numbers of students effected, indicators and characteristics of those students experiencing hearing loss, and appropriate listening environments and accommodations. Teachers of students with hearing loss are the appropriate resource for regular education teachers, however, they lack time and availability to collaborate effectively. They are also not formally trained in consultation practices which can negatively effect teachers' receptiveness to suggestions. It is imperative to provide those who educate students with hearing loss general knowledge of how to make learning accessible and successful.

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

The problem of limited faculty knowledge concerning hearing loss is evident in areas other than Site A and B. A review of the literature suggested there are ways to increase the knowledge of school faculties to better serve our students with hearing loss. Solutions include, improving the identification of students with hearing loss, informing the faculty of the characteristics and needs of students with hearing loss through inservice training and providing written literature, and improving collaborative efforts among the itinerant teacher for students with hearing loss and the regular education faculty.

Identification of Students With Hearing Loss

As was previously stated, the incidence of hearing loss has increased with the rise in the number of children experiencing ear infections (Holden-Pitt & Diaz, 1998). Classroom teachers can be an excellent resource in identifying students with hearing loss through their observations. Dodd-Murphy and Mamlin (2002) stated that due to the limitations of school screenings, teachers need to be made aware of the indicators of hearing loss so they can take action to assist these students. They cite the following physical symptoms that may signal a hearing loss: frequent earaches, draining ears, colds, and mouth breathing. Behavioral indicators include inattentiveness, frequent requests for repetition, inappropriate responses, confusing similar

sounding words, and withdrawing from social situations. Students may also self report that they are experiencing ear pain or difficulty hearing within the classroom setting.

Gravel (1996) suggested that giving parents an "ear history" form to fill out and return to school will assist in identifying these children. These students can then be placed on a list for possible follow up. Sites A and B currently ask parents to fill out a health history form. If ear health is a concern, this could indicate the need to gather more information. Follow-up could include asking the school nurse to do a hearing test, obtaining a doctor's report or copies of audiological evaluations and consulting with the classroom teacher regarding the academic progress and social skills of the student with hearing loss.

Characteristics of Hearing Loss

With improved identification of students experiencing hearing loss, classroom teachers need to be aware of the effects hearing loss may have on learning. Students with hearing loss may experience difficulties with reading and language skills (Nelson, 2001). They may fall behind their hearing peers. Phonics skills which are critical to reading success can be difficult to learn when a hearing loss is present or even when hearing loss fluctuates. Language skills can also be affected because language develops from what we hear. Since students with hearing loss often miss out on a clear message, they are at a distinct disadvantage and can lag behind their hearing peers.

Classroom teachers need to be aware that students with hearing loss can lack social skills and display inappropriate behavior. Since social situations rely heavily on hearing conversations, the student with hearing loss may be inadvertently left out. Making friends may be difficult at school. If the student with hearing loss becomes frustrated socially or with their academics, inappropriate behaviors may start to surface.

It is also critical to note that teachers need an awareness that the degree, type, and duration of hearing loss should be taken into account when assessing the effects of the hearing loss and making accommodations for the student with hearing loss. Luckner and Denzin (1998) stated that classroom teachers need to know that adaptations are best determined on an individual basis and will not be the same for all students with hearing loss.

Optimizing Classroom Acoustics

Once the hearing loss is identified, creating the best listening environment possible is essential for the success of these students. Students with hearing loss have difficulty listening and understanding auditory input even in the most ideal listening environment. The classroom itself would not be classified as ideal even before taking into account the noise generated from the teacher and students. Background noise from fans, heating, buzzing lights and hallway traffic are problematic. In an effort to solve this problem, Anderson (2001) reported a standards document that was developed to define acoustic criteria for newly constructed schools. Bess (2001) further added that construction of facilities should be built to cut down on noise leakage by using materials that absorb sound. Following these acoustic recommendations will create a more favorable listening environment which will be of benefit to all learners (Nelson, 2001). There are also ways to improve the acoustic environment with existing classrooms where the acoustics are not favorable. Simple additions such as carpeting over hard floors and using tablecloths would absorb sound and reduce reverberations. If noisy lights are present, replacing them with quieter sources would be beneficial. The classroom can be set up so that desks are staggered as opposed arranged in straight rows to allow for sound to travel more efficiently. Realistically, all background noises in the classroom cannot be eliminated. Seating students with hearing loss as far away from background noise as possible and close to the teacher or sound source is also beneficial.

Preferential Seating

An understanding of the effect that the listening environment has on the student with hearing loss is significant because listening is expected throughout the school day. Phonic Ear Incorporated reported in its 1994 publication, *Facts, Figures, and FM* that hearing is the basis of classroom learning and children spend at least 45% of the school day engaged in listening activities. One suggestion often given to the classroom teacher to assist the student with hearing loss is to preferentially seat the student in the front of the classroom. According to Flexer (1995) preferential seating can only be effective if the classroom teacher only teaches from the front of the room, in close proximity to the student with hearing loss. Since teachers typically move around their classrooms, they must be aware of the difficulty this creates for the student with hearing loss. Improving speaker to listener distance, using clear speech and using visual communication enhancements are ways to improve the listening environments (Crandell & Smaldino, 2001).

Use of Amplification

Another way to improve classroom acoustics is with the use of personal and classroom Frequency Modulation (FM) listening systems. Personal FM systems involve the teacher wearing a microphone and only the student with hearing loss using some type of amplification device, when recommended by the audiologist. There are many varieties of these devices. This device is beneficial in that it helps to provide more amplification of the teacher's voice and reduces background noise (Crandell & Smaldino, 2001). Similarly, classroom amplification systems involve the teacher wearing a microphone, but the sound is amplified through speakers set up in the classroom for all to hear. Flexer (1995) explained that classroom amplification can provide a favorable signal to noise ratio, improve voice quality, and generally improve the listening environment which would benefit all students, and especially those with hearing loss.

This is an especially beneficial solution since so many students experience fluctuating loss due to ear infections and perhaps have not been identified in the schools. Gaining an understanding of how this amplification system helps students listen more effectively will assist teachers in utilizing the equipment appropriately and consistently.

Accommodations

Along with being aware of the acoustic and audiological needs, regular education teachers need to be informed that students with hearing loss will still experience communication breakdowns (Caissie & Wilson, 1995). Pillai (1997) further suggested that classroom teachers need to be aware of the occurrence of misunderstandings and that students with hearing loss have to fill in the gaps of what they have not heard or have possibly misheard. Even with the use of amplification, these situations still occur. The ability to fill in the gaps is directly related to the person's language level. Thus, the younger students with a lower language level will experience much more difficulty in completing this task than an adult listener (Smaldino & Crandell, 2001).

Another barrier to listening is one that is commonly misunderstood by classroom teachers. Speaking more loudly is not an appropriate accommodation for students with hearing loss. Well meaning classroom teachers often report that they speak loudly, so that the student with hearing loss should not have any difficulty. What they don't understand is that louder is not better as it only serves to distort the spoken message (Flexer, 1995). Classroom teachers need not exaggerate nor increase the volume of their voices to effectively communicate to students with hearing loss.

There are accommodations that are appropriate for the classroom teacher to employ to create more favorable communication when speaking to the student with hearing loss. The teacher can speak clearly and naturally, using gestures when appropriate. Since the student with hearing loss relies on visual clues to enhance their understanding, consistently facing the student

when speaking is helpful. The student can gain clues by noting the facial expression, body language, and using speechreading. Providing supplementary visual aids such as writing key ideas on the board and using pictures enhance understanding as well. In the event that the student with hearing loss has not heard or misheard the message, repeating or rephrasing the message should be done.

Simulation of Hearing Loss

The goal of improving the faculty's awareness of hearing loss can be difficult to achieve because there is so much information to know. One activity suggested by Kuster (1993) to help regular classroom teachers improve their understanding of and gain perspective on their students who experience a hearing loss was to allow school faculty to experience a whole day of simulated hearing loss. Her suggestion comes from a study she conducted with college students in which the students wore ear plugs for an entire day and recorded their experiences. The ear plugs simulated a mild hearing loss, which can also be experienced by having an ear infection. In a composite of the student responses, Kuster found that the participants were surprised at the frustration, the need to concentrate more during the communication process, the fatigue and isolation they experienced. For example, during classes they were frustrated by how much they missed of what the teacher said. They reported missing a part of the spoken message and having more difficulty hearing when their classmates responded. Group interactions were more challenging and they needed to concentrate more to understand. They said that it was also difficult to follow who was speaking in the group. Often by the time they realized a new person was talking, they had missed some of the communication. The effort listening took while wearing the ear plugs was great and left the participants fatigued. They further found that they preferred to communicate one-on-one. By the end of the day they said they felt isolated, yet wanted to be alone because of the difficulty in communicating.

This activity, or some variation, could be explored by the researchers to provide the faculties at Sites A and B insights into the characteristics and needs of students with hearing loss. Following the activity, teachers would be asked to share and bridge their experiences to the needs of students with hearing loss in their classrooms. For example, teachers would gain an understanding of how background noise effects the ability to hear and participate in class.

Current Trends

Current trends in education are being employed at both Sites A and B. Teachers need to be aware of how these methods effect the listening environment in their classroom. This school district utilizes cooperative grouping and Quantum Learning practices. Cooperative grouping has many educational benefits, but presents a difficult listening challenge to the student with hearing loss (Caissie & Wilson, 1995). Typically, all the groups are together in the classroom and many people are talking at the same time, creating much background noise. Allowing the group containing the student with hearing loss to go to a quieter area is beneficial. Some Quantum Learning activities involve following directions while music is being played. This background music presents a greater listening challenge for the student with hearing loss to attend to the speaker. Once teachers identify these instances in their own classrooms, they can adapt the activity so that background noise is not present during instruction.

Collaboration

Providing inservice training to regular education teachers is a solution to improving their understanding about hearing loss (Gaustad, 1999). Special education teachers of students with hearing loss must provide this information and also serve as a resource to the regular education teachers throughout the school year. Although it has been reported in the literature that ample time does not exist for this critical duty (Yarger & Luckner, 1999), researchers believe improvement can be achieved by scheduling time during building inservices to meet with staff.

Collaboration by the itinerant teacher may be difficult if he/she is viewed as a visitor to the classroom and not a member of that school (Antia, Stinson & Gaustad, 2002). Itinerant teachers are provided only limited time in each of the buildings they service. To be effective, each member in the collaborative process needs to be valued for his/her expertise. Yarger and Luckner suggest that itinerant teachers build collaborative relationships by finding and implementing ways that are comfortable for the classroom teacher to communicate. Hudson and Glomb (1997) add that professionals engaged in the collaboration process need to be willing to evaluate their own feelings and attitudes that could prevent its effectiveness. Further, being consistent, honest, and possessing effective listening skills are traits that also assist in the collaborative process. The development of these interpersonal skills are essential to collaborative success (Luckner, 1999).

The collaboration process itself should involve discussing curricular modifications, the environment, and linguistic level changes for the student with hearing loss (Luetke-Stahlman, 1998). Regular education teachers and hearing itinerant teachers can use this collaboration time to problem solve situations and address social concerns that have arisen (Stinson, 1999).

Researchers, upon reviewing the solutions reported in the literature, decided to attempt to improve faculty knowledge of hearing loss and its effects on education through inservice training, dissemination of monthly newsletters, and being available for collaboration. Information provided to staff was determined directly by the results of a survey and questionnaire designed to assess their knowledge. A postintervention assessment was administered to determine the effectiveness of the intervention.

Project Objective and Processes

As a result of providing staff development, disseminating written literature including a monthly newsletter, and providing one on one assistance when needed, during a period of September through January 2003, the faculties in the targeted elementary schools will increase their awareness regarding the prevalence of hearing loss and the effects this has on learning in kindergarten through fifth grade as measured by surveys, questionnaires, observations (including an anecdotal record), and a document analysis.

In order to accomplish the project objective, the following processes were necessary:

1) Measure faculty's general knowledge of hearing loss preintervention
2) Create staff development materials
3) Implement staff development
4) Disseminate written material
5) Collaborate with faculty on an individual basis as needed.
6) Measure faculty's general knowledge of hearing loss postintervention

Project Action Plan

The following action plan was developed to implement the following solution strategies to increase faculty knowledge of the prevalence of hearing loss and its effects on learning: provision of professional staff development, dissemination of written literature in the form of a newsletter, and availability for follow-up and processing on a one-on-one basis as necessary.

<u>September</u>

- Obtain informed consent from faculty participants.
- Administer Faculty Survey (Appendix A)
- Administer Faculty Questionnaire Parts I & II (Appendix B and C)
- Schedule staff development for November

- Begin collecting data for document analysis
- Begin anecdotal record of informal conversations
- Provide individual collaboration with faculty as needed

October

- Prepare materials and presentation for staff development
- Analyze previously collected data
- Continue to collect data for document analysis
- Continue anecdotal record of informal conversations
- Prepare newsletter for distribution in November
- Provide individual collaboration with faculty as needed

November

- Present staff development workshop
- Distribute November newsletter (Appendix J)
- Analyze previously collected data
- Continue to collect data for document analysis
- Continue anecdotal record of informal conversations
- Prepare newsletter for distribution in December
- Provide individual collaboration with faculty as needed

December

- Schedule date for faculty to complete postintervention questionnaires
- Distribute December newsletter (Appendix K)
- Analyze previously collected data
- Continue to collect data for document analysis
- Continue anecdotal record of informal conversations

- Prepare newsletter for distribution in January
- Provide individual collaboration with faculty as needed

January

- Administer postintervention faculty questionnaire (Appendix N and O)
- Distribute January newsletter (Appendix L)
- Analyze previously collected data
- Collect final data for document analysis
- Finalize anecdotal record of informal conversations
- Provide individual collaboration with faculty as needed
- Analyze data taken from questionnaires
- Review and assess all data (Appendix P and Q)
- Write thank you notes to site administrators and participants
- Distribute thank you notes

Methods of Assessment

Data was collected by administering a faculty survey and questionnaire, taking anecdotal records of informal conversations with faculty members, and analyzing school documents and records. The researchers collected signed informed consent from 69 participants (31 at Site A and 38 at Site B) and provided each faculty with a brief overview of the research project. Surveys and questionnaires were administered prior to and following intervention at each site.

Surveys and Questionnaires

The Faculty Survey (Appendix A) included 11 items designed to provide researchers with information about participants' personal experience with hearing loss and a self-rating of their knowledge of issues relating to hearing loss. Six questions asked participants to respond either "yes" or "no" to statements concerning their personal experience with hearing loss. Participants were informed this section was optional and voluntarily provided this information. They were then asked to rate their knowledge level of five categories pertaining to hearing loss on a scale of one to four, one being the lowest and four being the highest. The survey provided researchers with information regarding participants' self-report of their knowledge level of and personal experience with hearing loss.

The Faculty Questionnaire (Appendix B and C) had two parts. Each included 10 statements regarding hearing loss and its effects. Participants were asked to read each statement and circle "T" if they believed the item to be true and "F" if they believed the item to be false. The questionnaire provided researchers with information regarding the extent of the faculties' knowledge of hearing loss and its effect on the learner.

Participants were instructed to complete surveys and questionnaires, omitting reference to names, seal them in the provided envelopes, and place them in collection boxes located in the rooms for this purpose. Data was stored in a locked file cabinet at the researchers' office.

Document Analysis

A document analysis (Appendix E) included a review of existing school records involving: 1) students previously identified with hearing loss, 2) students' health concerns, 3) results of students' hearing assessments, and 4) written comments from teacher evaluation forms. Information was gathered at each site from September to January and recorded on Appendix E as it became available to researchers. Data collected was stored in a locked file cabinet at the researchers' office. To protect confidentiality, names were not referenced on document analysis forms. The document analysis provided researchers with information regarding the prevalence of students with hearing loss at each site and the ability of the faculties to observe and report the indicators and effects of hearing loss.

Anecdotal Records

Researchers used an anecdotal record form (Appendix F) to record observations of informal conversations with faculty members and noted written comments from evaluations as they occurred. Researchers documented conversations occurring between September and January 2003 at each site. Information gathered included the date, time, grade level, setting in which the conversation took place, written account of the conversation, and researcher comments. The completed anecdotal record forms did not reference names and were kept in a locked file cabinet in the researchers' base building office. The informal conversations and comments recorded were used to analyze the extent to which the faculty members understood students with hearing loss.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

The intent of this project was to increase faculties' knowledge of hearing loss and the effects it has on learning at the targeted elementary schools. The implementation of a staff development inservice, the distribution of a monthly newsletter, and collaboration with building faculties were provided to effect the desired changes.

Researchers began the project by setting up meetings with site principals. The project purpose was reviewed and expanded upon by explaining the increase in the numbers of students experiencing hearing loss and the need for teachers to understand this population of learners. A procedure for collecting informed consent was determined and the three part implementation process, (1) preintervention assessment, (2) intervention, (3) postintervention assessment, was scheduled. In addition, the distribution of a monthly newsletter targeting issues relating to hearing loss was discussed. These meetings resulted in differing procedures for obtaining informed consent.

At Site A, the building principal offered to obtain informed consents at a faculty meeting in September by explaining the project and announcing the availability of consent forms placed in the teacher's work room to be picked up, signed and returned to Researcher A's mailbox. After one week and very few consents received, Researcher A sent a follow up letter to the faculty to

further explain the project, offer to address questions or concerns, and to request their participation. A total of 33 informed consents were received over the five week time period leading up to the preintervention assessment.

At Site B, the building principal suggested gathering informed consents at a September faculty meeting. Researcher B attended the meeting, provided an explanation of the project, addressed questions and concerns, and distributed consent forms. A total of 36 faculty members signed consent forms and placed them in a collection box as they exited the meeting. Two faculty members not in attendance were noted and given the consent forms at a later date.

A document analysis of the list of students previously identified with hearing loss and the confidential health concerns list were completed at each building to determine approximate numbers of students who have known hearing losses, a history of hearing loss, or are currently experiencing hearing difficulties. Of 512 students at Site A, seven were identified and monitored by the hearing itinerant teacher and 54 were identified on the health concerns list. Site B identified 23 of 688 students monitored by the hearing itinerant teacher and students with hearing concerns were not reported on the health concerns list.

Data collection methods were reviewed and revised by researchers before the administration of the preintervention assessment in October. A total of 69 participants (31 at Site A, 38 at Site B) participated in the assessment on a volunteer basis. A system of coding (Appendix D) was developed to ensure anonymity and to identify a comparative sample of teachers who participated in both pre and postintervention assessments. Preliminary data was collected at an October faculty meetings at each site by administering: a survey (Appendix A) to report personal background experience with hearing loss and teacher self perception of their knowledge of categories relating to hearing loss and a two-part questionnaire (Appendix B and C) consisting of 20 true or false questions representing the five identified categories from the survey

designed to assess general knowledge of hearing loss. The completed surveys and questionnaires were collected at the end of each meeting.

Researchers met to score and tabulate results. An analysis of those results revealed similar needs for knowledge development at both sites, which allowed the researchers to plan and implement the same intervention. Monthly newsletters and the staff development inservice directly targeted weaknesses identified by the preintervention assessment. The first issue of *Now Hear This,* the monthly newsletter (Appendix J), focused on prevalence, indicators, and identification of students with hearing loss and was distributed one week prior to the inservice. Researchers planned the staff development inservice, created handouts, and arranged for the necessary equipment needed for the inservice presentation. Each researcher presented for 40 minutes on the following targeted areas: (1) prevalence, (2) indicators, (3) effects, (4) listening environments, and (5) accommodations (Appendix G) in November at their respective sites. Participants received a handout with information from the presentation to follow and take notes (Appendix H). The inservice information was provided in a lecture format, an interactive simulation, a small group processing and application, and time allotted for questions and answers. Participants were asked to fill out an anonymous evaluation to provide feedback for the researchers on the effectiveness of the inservice (Appendix I). Researchers met and reviewed feedback for the purpose of reflection and to discuss ways to improve future inservices.

Following the inservice, researchers developed the next monthly newsletter and distributed it in December. This issue of *Now Hear This (*Appendix K) focused on good listening environments and the effects noise has on listening. It provided teachers with a checklist to identify how "listener friendly" their classrooms were and gave suggestions for developing listening skills and reducing background noise. The next newsletter (Appendix L) was developed to target assistive listening devices and appropriate accommodations for students

with hearing loss. This final newsletter was distributed in January, prior to postintervention assessments.

To measure the effectiveness of the project, postintervention assessments were scheduled at Site A in February and Site B in January. The original survey was modified by removing experiential questions and adding a participant rating of the effectiveness of the intervention. Questionnaire items were rearranged to eliminate familiarity. Postintervention assessment included the modified survey (Appendix M) and a retake of the two part questionnaire (Appendix N and O). A total of 58 teachers participated in the postintervention assessment (27 at Site A, 31 at Site B). Participants were asked to code and complete their postintervention surveys and questionnaires and place them in a collection box. Researchers thanked everyone for their support and participation in the study.

Following the administration of the postintervention assessments, researchers met to score and tabulate data. postintervention results were recorded and a comparative sample was obtained by matching the codes of pre and postintervention surveys and questionnaires. The comparative sample consisted of 53 participants (23 at Site A and 30 at Site B) that were involved in all parts of the intervention.

Presentation and Analysis of Results

Data was collected by the administration of a postintervention assessment which consisted of a faculty survey, two part questionnaire, and anecdotal records collected since the implementation of the inservice. The survey asked teachers to rate their knowledge of five targeted categories related to hearing loss on a scale of one to four, one being the lowest. Results of pre and post knowledge ratings for both sites are presented in Figures 4.1 and 4.2 (p.40 & 41). Overall knowledge ratings increased in all five categories at both sites. Preintervention ratings of very low and low changed to average and high ratings in the postintervention.

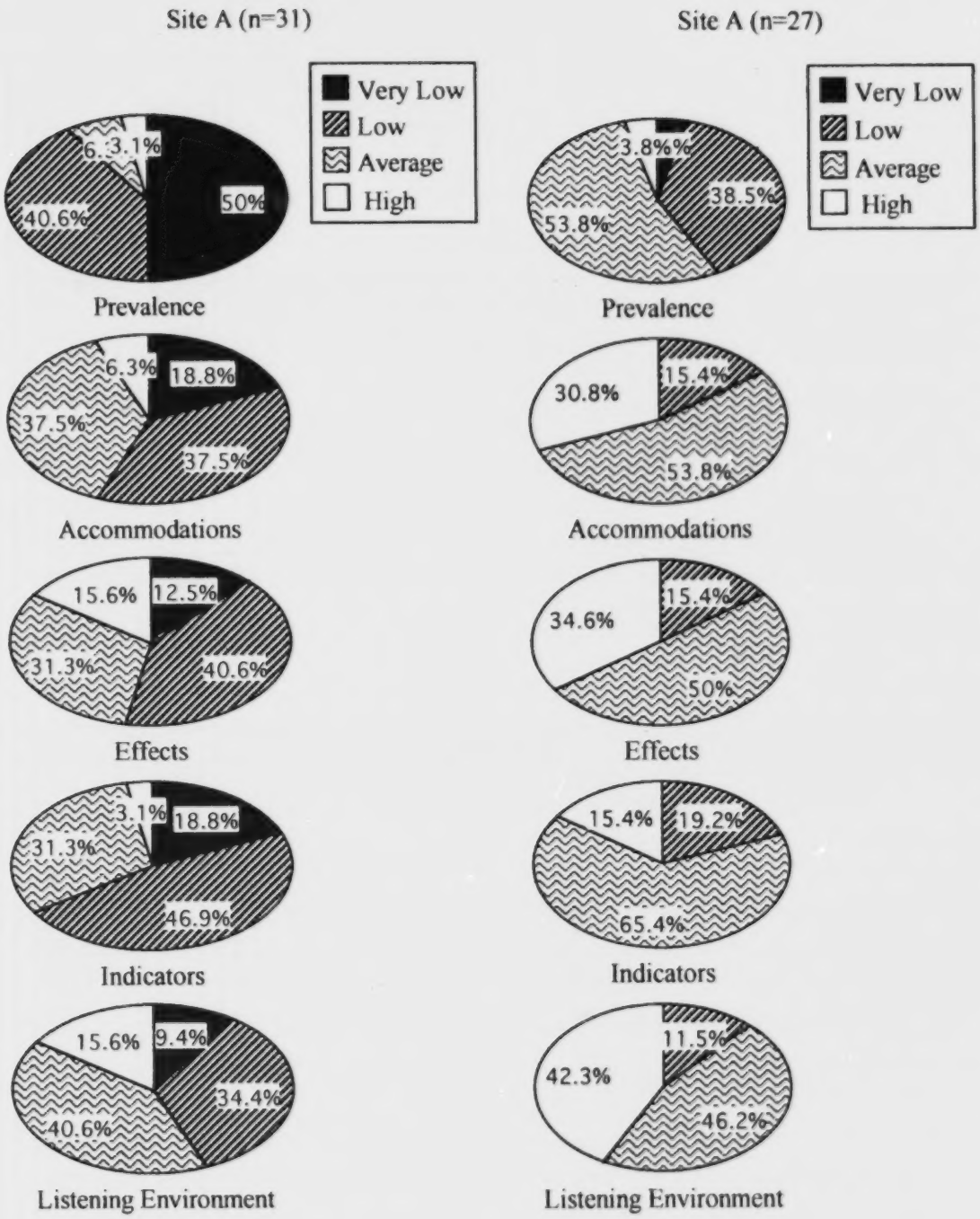


Figure 4.1 Participants' pre and postintervention knowledge rating by category at Site A

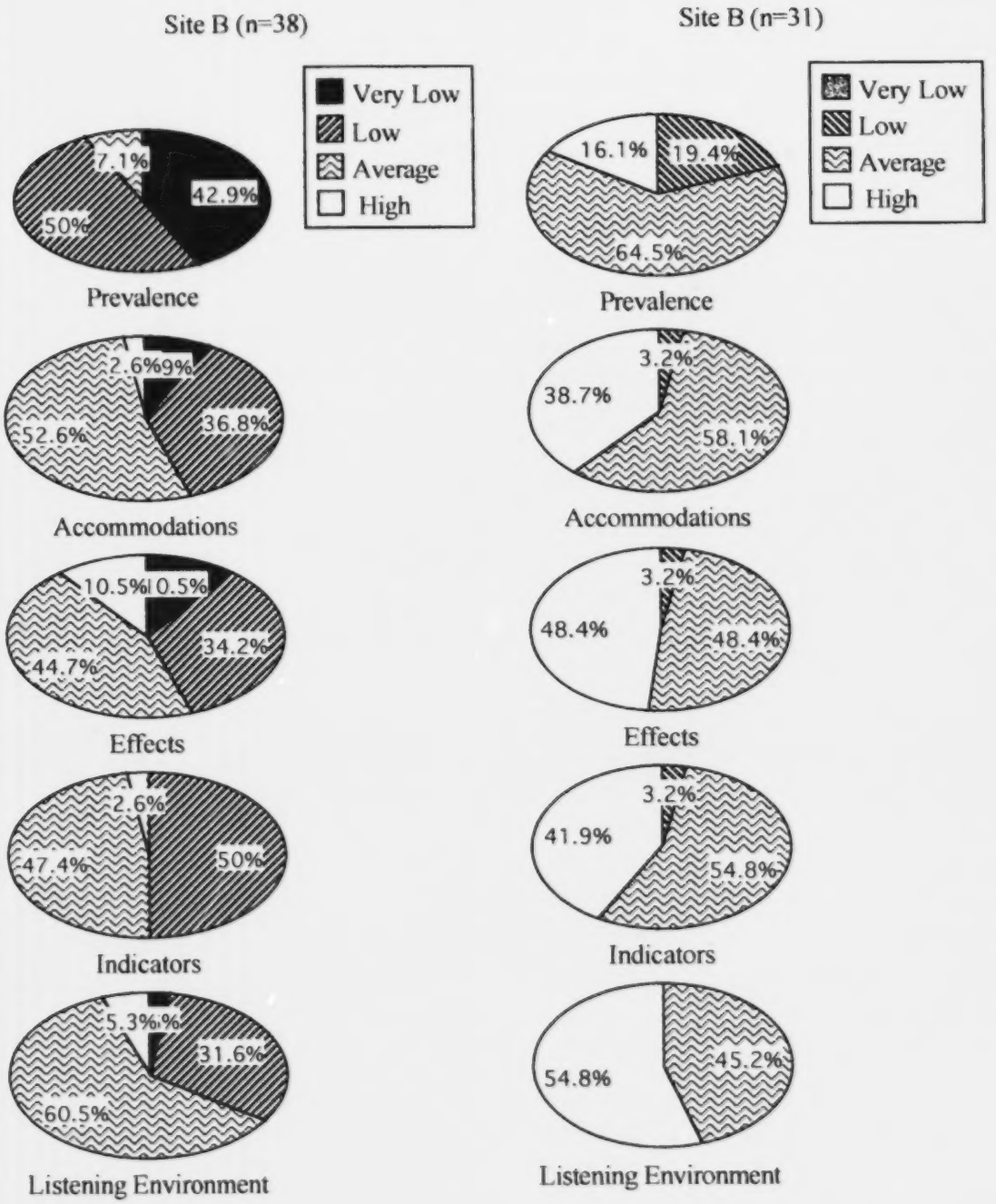


Figure 4.2 Participants' pre and postintervention knowledge rating by category at Site B

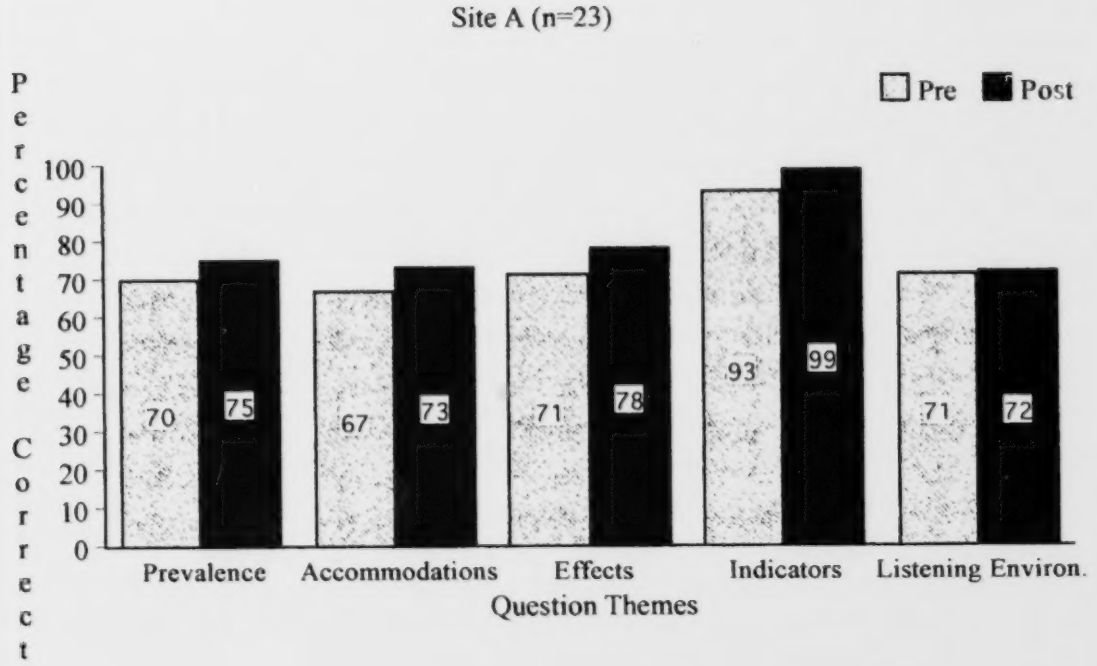
Faculties at both sites indicated an increase in their overall knowledge of hearing loss and its effects on education. They responded that the staff development inservice and monthly newsletters were both beneficial to their increase in knowledge, and they supported the continuation of the newsletter (Appendix P).

Figure 4.3 (p.43) shows a comparison of each site's performance on pre and postintervention questionnaires. This assessment indicated the faculties actual knowledge in the categories of hearing loss before and after receiving newsletters and inservice training. Results show an overall increase in knowledge of hearing loss at both sites. Both faculties averaged a 5% increase of questions correct. Site A showed a 5% or greater growth in four of five categories of questions and Site B showed an 8% or greater growth in three categories.

The intervention was designed to increase faculty awareness in all categories, yet primarily targeted increasing knowledge of prevalence, effects of hearing loss, and good listening environments. Newsletters were designed to supplement the inservice and provide further information in all categories. Assessments revealed that faculties at both sites increased their knowledge more significantly in the areas targeted by the inservice.

Postintervention assessment was completed after the full implementation of the intervention. The inservice presentation was provided approximately two months prior to the assessment. Researchers theorize that percentages of questions correct may have been higher had less time lapsed between the assessment and inservice intervention.

Results at both sites showed that faculties were positively influenced by the inservice training and newsletter distribution. Their receptiveness to this intervention would support its continuation to further develop faculty knowledge of hearing loss and its effects on education.



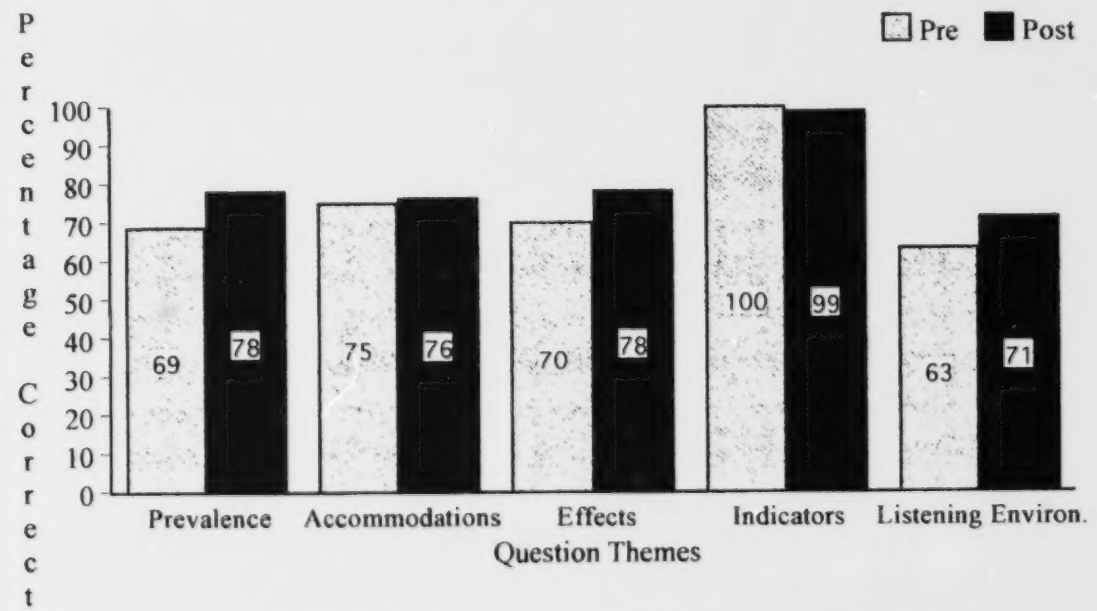


Figure 4.3 Participant's pre and postintervention percentage of questions correct at Sites A and B

Conclusions and Recommendations

Based on the presentation and analysis of the data collected through postintervention assessments, faculties at Site A and Site B showed increased knowledge of hearing loss and its effects on learning. The intervention of the staff development inservice, the dissemination of monthly newsletters, and improved collaborative efforts between faculties and researchers, appear to have been effective in meeting the project objective.

The solution strategy employed by the researchers allowed them to provide this beneficial knowledge to an entire faculty as opposed to individual teachers on an as needed basis. Through raising the teachers' awareness in the five categories of issues related to hearing loss (prevalence, indicators, effects, listening environments, and accommodations) faculties were provided with the tools to assume a more proactive role in meeting the needs of this population.

Researchers believe the intervention yielded a positive outcome and would suggest the following recommendations: expand the project to include other schools in the district, involve other hearing itinerant teachers in the intervention process and delivery, continue to expand and modify inservice content to meet needs at each building, increase time allotted for and frequency of inservices, provide simulation of hearing loss, provide time for follow-up discussion addressing questions and concerns, and continue distribution of newsletters.

Researchers predict that this intervention would be beneficial for all schools in the district. To begin this undertaking, a review of the intervention would be provided to other hearing itinerant teachers currently employed. The hearing itinerant teachers could work together to plan the inservice and newsletters based on the needs at each building. For example, an inservice given to staff at an elementary school would be different than one provided to staff at a secondary school. Realistically, district wide implementation of this intervention would be accomplished over a span of several years.

Since experience and dialogue are critical to developing a true understanding of the information presented, researchers recommend that more time be allotted for the inservice to allow for simulation, group processing, and whole group discussion. Simulation of hearing loss could occur by having teachers volunteer to spend a day wearing ear plugs replicate a mild hearing loss. They would be asked to record their experiences and share their insights with staff at the inservice. This experience would be more meaningful than a lecture. Group processing would allow the teachers an opportunity to apply and internalize what they have learned. Whole group discussion then allows the entire group to benefit from questions insights, and experiences generated in group processing.

The distribution of monthly newsletters as part of the intervention was well received and therefore continuation is recommended. Quarterly newsletters could be created and distributed district wide throughout the school year. Newsletters would be informative, concise, and target important information relating to hearing loss. They would also serve as a consistent reminder to teachers to be cognizant of hearing loss and its effects on learning.

Implementation of staff inservice would need approval from each building principal. Consideration would depend on receptiveness to the project and availability of time. To encourage participation, researchers might also suggest this project be included as part of a more comprehensive presentation targeting all areas of special education.

Increasing faculty knowledge of hearing loss and its effects on learning at two buildings in the district has proven to be effective. Researchers intend to expand the project to progressively include more schools each year with district wide implementation the final result.

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Appendices

Appendix A
Preintervention Faculty Survey

Please circle YES or NO for the following questions.
****Questions #1-3 are optional.**

1. I have a hearing loss.	**YES**	**NO**
2. I wear a hearing aid.	**YES**	**NO**
3. I have a family member and/or friend with a hearing loss.	**YES**	**NO**
4. I know who to contact if I suspect a student has a hearing loss.	**YES**	**NO**
5. I have or had a student that receives direct hearing itinerant services.	**YES**	**NO**
6. I have received inservice training on students with hearing loss.	**YES**	**NO**

Rate your knowledge of these topics on a scale of 1-4, with 1 being the lowest and 4 being the highest.

	Lowest			**Highest**
Prevalence of hearing loss	**1**	**2**	**3**	**4**
Indicators of possible hearing loss	**1**	**2**	**3**	**4**
Effects of hearing loss on education	**1**	**2**	**3**	**4**
Good listening environments	**1**	**2**	**3**	**4**
Accommodations for hearing loss	**1**	**2**	**3**	**4**

Appendix B
Faculty Questionnaire
Part I
Form A

Please circle "T" if you believe the statement is true, or "F" if you believe the statement is false.

1. A hearing aid brings hearing back to normal just as eye glasses bring vision back to normal.	T	F
2. It is easier for a person with hearing loss to understand speech in a noisy place when the speaker is closer rather than farther away.	T	F
3. Hearing loss can come and go.	T	F
4. In lipreading, we learn to "see each sound" and can understand complicated messages even at a great distance.	T	F
5. There are three types of hearing loss.	T	F
6. Hearing loss does not impact behavior	T	F
7. Hearing loss is a low incidence condition.	T	F
8. An inner ear infection is often treated with tubes.	T	F
9. Classroom background noise can not be eliminated	T	F
10. Using a loud voice helps a person with a hearing loss understand you when you speak.	T	F

Appendix C
Faculty Questionnaire
Part II
Form B

Please circle "T" if you believe the statement is true, or "F" if you believe the statement is false.

1. Hearing loss shares characteristics with other disabilities.	T	F
2. Preferential seating ensures success for the student with hearing loss in your classroom.	T	F
3. A good strategy is to ask the student with hearing loss, "Do you hear me?"	T	F
4. Hearing aids work best at a distance of 3-5 feet.	T	F
5. Students are experiencing fewer ear infections.	T	F
6. Working in cooperative groups is difficult for the student with hearing loss.	T	F
7. A mild hearing loss may effect the development of reading and language skills.	T	F
8. Students with hearing loss are visual learners.	T	F
9. Hearing loss can be mistaken for inattention.	T	F
10. On average, students are engaged in listening activities for at least 45% of their day.	T	F

Appendix D

In order to make sure the same people participate in the pre and post intervention assessment please use the following formula to create an anonymous code for you to write on **each** form for tracking purposes

ID Code

_____	_____	_____
First letter of your first name	The # of the the month you were born	The first letter of your mother's maiden name

Example: J11S

Appendix E
Document Analysis

Researcher A B Site A B

Date Collected: _____

Previously identified students with hearing loss _____

School record of health concerns _____

Results of hearing assessments _____

Written teacher comments from evaluation forms _____

Researcher Comments:

Appendix F
Anecdotal Record

Researcher A B Site A B

Date: _____

Time: _____

Grade Level: _____

Setting: _____

Record of Conversation:

Researcher Comments:

Appendix G

Inservice Outline
November 20, 2002

I. Welcome!
   A. Overhead with hearing joke.
   B. Purpose is to provide information about students with hearing loss.
   C. Invitation to follow up with me.

II. Hearing
   A. Parts of the ear, functions, and types of loss (Overhead)
   B. The audiogram and levels of hearing loss (Overhead)
   C. Increase in prevalence of hearing loss
   D. Indicators teachers can look for (overhead)

IV. Hearing Loss Experience
   A. Tape of spelling test (Tape)
   B. Answers of test. (overhead)
   C. Tape of words with background noise. (Tape and Overhead)

V. The Listening Environment (overhead)
   A. Classrooms
      1. Noise from things in the classroom
      2. Noise from people talking
   B. Specials-gym, music
   C. Teaching strategies

VI. Academic Factors and Coping Skills
   A. Ways a hearing loss effects student's development. (overhead)
   B. Ability to fill in gaps is difficult (noise and language)
   C. Students don't know what they don't hear (Overhead)

VII. Teacher Processing at their tables (handout)

VIII. Wrap up and evaluation of inservice (handout) and thanks!

Appendix H

WELCOME!

INSERVICE ON

HEARING LOSS

NOVEMBER 20,2002

Given By:
Jennifer Gooden and
Winnie Rogers,
Hearing Itinerant Teachers

TEACHERS

Teachers are those who open their hearts to others, who never think twice about giving of themselves.

They are wonderful, warm-hearted people who make all the difference in our lives.

They teach.

Thank you for all the ways you give so much of yourself to others and for all the ways you brighten the future for your students.

Hearing Aids

An old man was wondering if his wife had a hearing problem.

So one night, he stood behind her while she was sitting in her lounge chair.

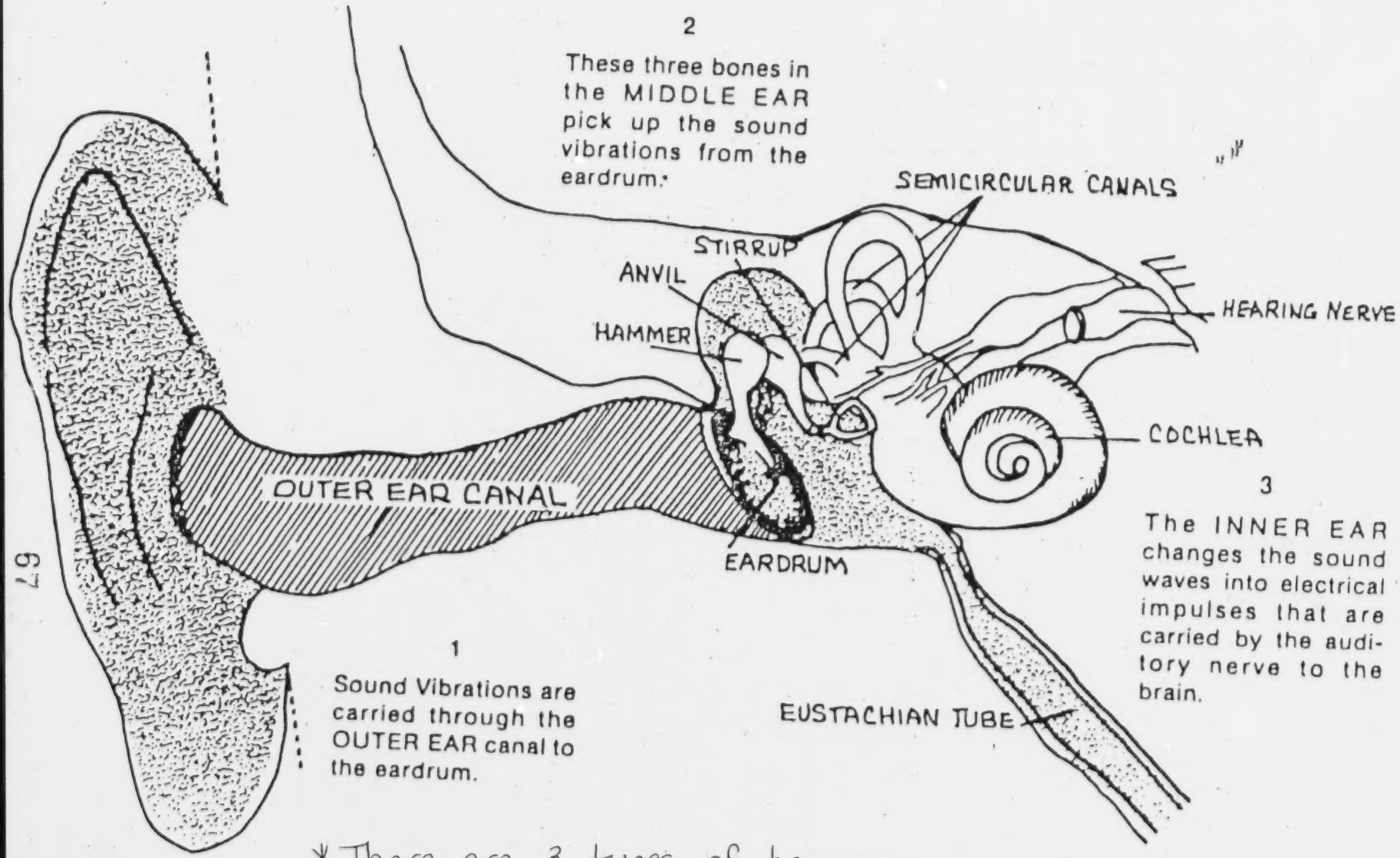
He spoke softly to her,
"Honey, can you hear me?"

There was no response.

He moved a little closer and said, again,
" Honey, can you hear me?"

Still, there was no response. Finally, he moved right behind her and said,
"Honey, can you hear me?"

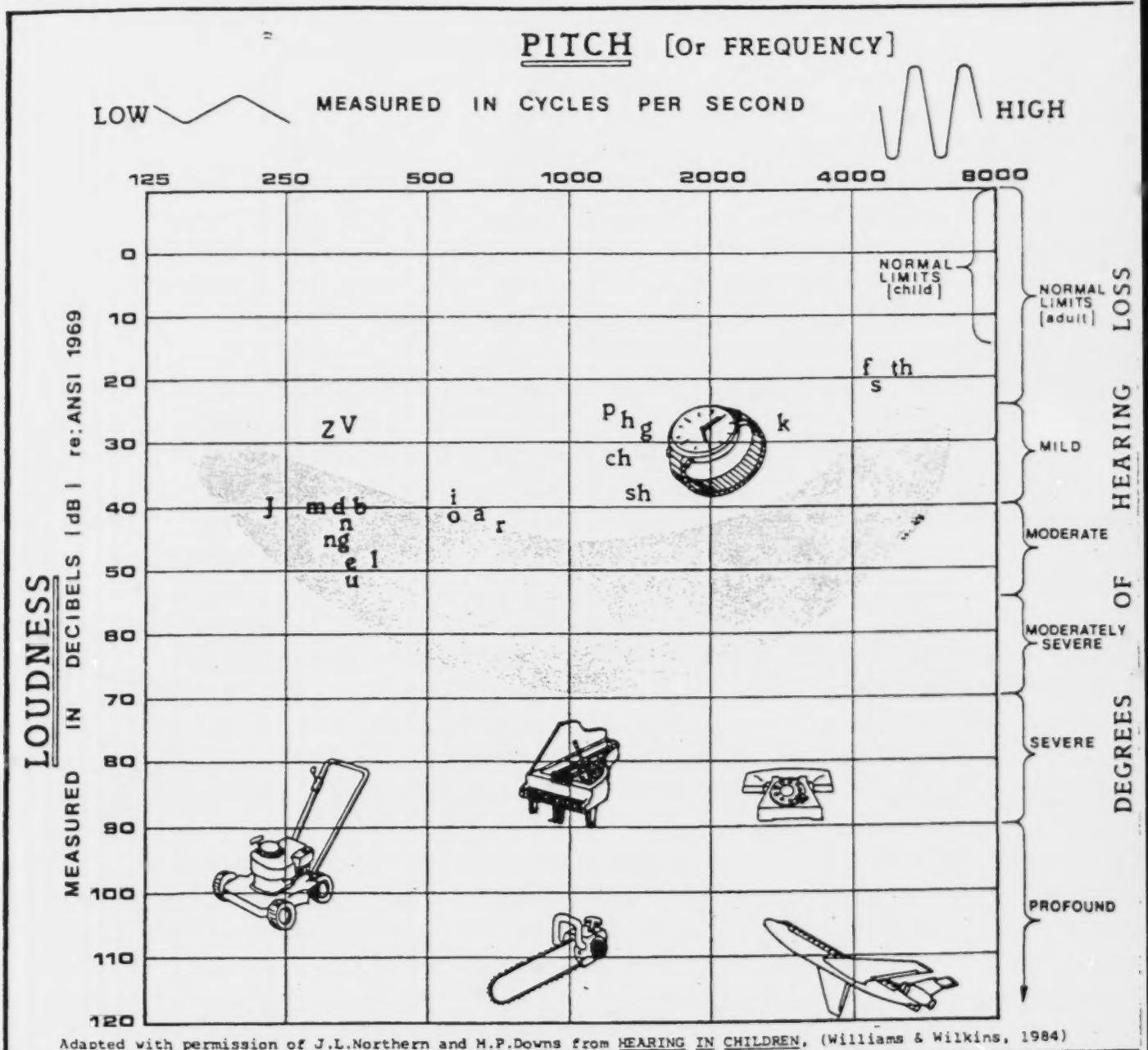
She replied, "For the third time, Yes!"


2
These three bones in the MIDDLE EAR pick up the sound vibrations from the eardrum.
SEMICIRCULAR CANALS
STIRRUP
ANVIL
HAMMER
HEARING NERVE
COCHLEA
OUTER EAR CANAL
EARDRUM
3
The INNER EAR changes the sound waves into electrical impulses that are carried by the auditory nerve to the brain.
1
Sound Vibrations are carried through the OUTER EAR canal to the eardrum.
EUSTACHIAN TUBE

*There are 3 types of hearing loss. ① conductive ② sensori-neural ③ mixed

FAMILIAR SOUNDS AUDIOGRAM ©

NAME DATE



Adapted with permission of J.L.Northern and M.P.Downs from HEARING IN CHILDREN, (Williams & Wilkins, 1984)

LOUDNESS LEVELS OF COMMON SOUNDS (IN DECIBELS)

10 dB	Breathing	80 dB	Rush Hour Traffic	120 dB	Jet Airport
30 dB	Whisper	90 dB	Food Blender	140 dB	Shotgun Blast
40-60 dB	Conversation	100 dB	Train		
70 dB	Typewriter	110 dB	Chain Saw		

SHADED AREA REPRESENTS RANGE OF CONVERSATIONAL SPEECH

LDOS Familiar Sounds Audiogram Form-2, 6/84

B.A.Chaudoin, M.S.,CCC-A
To Reorder, call or write: Louisville Deaf Oral School, 414 W. Ormsby, Louisville, Ky., 40203, 1-502-636-2084

Spelling test

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

BACKGROUND

NOISE

creates a very challenging listening environment for students with hearing loss.

How Hearing Loss May Effect a Student in theClassroom

Type, Level and Duration of Hearing Loss Must be Considered

Language Skills

Reading Skills

Social

Behavior

Ways to Help the Student with Hearing Loss.

Discuss with your table ways that you are doing or can do each of these in your classroom. Include in your discussion teaching strategies that might prevent these from happening.

1. Check for understanding. Don't ask, "Did you hear me?"

2. Face the child.

3. Provide visuals.

4. Get rid of as much background noise as possible.

Appendix I

HEARING LOSS INSERVICE EVALUATION 11/20/02

Please answer the following (circle one):

1. Helpfulness of the information:

1 2 3	4 5 6 7	8 9 10
Little benefit	Somewhat helpful	Very helpful

2. Use of Media/Handouts

1 2 3	4 5 6 7	8 9 10
Poor	Good	Excellent

3. Rate this inservice on a scale of 1-10:

1 2 3	4 5 6 7	8 9 10
Poor	Good	Excellent

4. I found the following beneficial: _____

_____

_____

5. I would like more information about: _____

_____

_____

Now Hear This....

Hello Neubert Staff!!

We hope you enjoy the November edition of *Now Hear This,* a newsletter put together by hearing itinerant teachers to provide you with information about hearing loss and its effects on education.

Indicators of Hearing Loss

- ⇨ Often says "huh?" or "what?"
- ⇨ Does not respond when spoken to
- ⇨ Unable to follow oral directions
- ⇨ Seems confused or puzzled, not understanding what has been said
- ⇨ Tends to withdraw from group conversation
- ⇨ Turns one ear toward the speaker
- ⇨ Talks louder or softer than expected
- ⇨ Watches the speakers face intently
- ⇨ Has frequent colds, congestion, or allergies
- ⇨ Earaches and Ear infections

Hearing Health

Flu and cold season can also mean an increase in students experiencing ear infections. If a student complains of ear pain or you notice a change in their listening behavior please refer them to the nurse.

"Hear's" What's Coming Up

What: Inservice on Hearing Loss

When: November 20, 2002
School Improvement Meeting

Where: Multi-Purpose Room

See you there!!

Hearing Screenings

A big thank you to the nurses who conduct the hearing screenings. All students in kindergarten, first, second, and third grade. All special education students, and all students with previously identified hearing losses will have their hearing screened annually. Something to remember..... A student may pass a screening at one time and experience a problem at a different time of the year. If you suspect a student is having difficulty hearing, please refer him/her to the nurse for a hearing test.

??

Did you know ear infections are the cause of five million school absences annually and are the most common reason for doctor visits in children under age 15?

Research indicates that at any given time, as much as 9% of a school population can have some type and degree of hearing loss. That could account for a student in every classroom.

Now Hear This....

Volume 2 December 2002

Happy Holidays Neubert Staff!!

Thank you to all who attended the November 20th Inservice. We are so fortunate to work with such a dedicated staff.

Noise! Noise! Noise!

As you already know, classrooms are productive, yet noisy places.

For students with hearing loss a noisy environment greatly impacts his/her ability to hear understand a spoken message.

It is impossible to eliminate all background noise, but we can often reduce it.

"Hear" are some things you can you do.....

- ☑ Eliminate as much background noise as possible
- ☑ Speak in a clear voice, not too loud or too soft
- ☑ Close the door during instruction
- ☑ Cover hard surfaces with cloth and other absorptive materials
- ☑ Repeat and Rephrase
- ☑ Avoid excessive use of irony, figurative language and idioms.
- ☑ Question students regularly for comprehension
- ☑ Provide fun listening practice
- ☑ Encourage questions

How "Listener Friendly" Is Your Classroom?

- ☐ Are there external noise sources outside your classroom? (playground, traffic, construction)
- ☐ Is your classroom near a noisy area in the school ? (cafeteria, gym, busy hallway, band)
- ☐ Does your classroom have internal noise sources? (fans, heating and cooling systems, lights, music, student activity)

Do any of the above apply to your classroom? If so, you may have a challenging listening environment.

- ☐ Do you evaluate listening skills and provide programs to strengthen these skills?
- ☐ Do you make listening fun?
- ☐ Do you ensure that the students understand directions both oral and written?
- ☐ Do you provide repetition and rephrasing of key ideas and directions?
- ☐ When you speak, do you use clear, concise language?

Do you do any or all of the above to help promote listening skills and facilitate a good listening environment?

Now Hear This....

Volume 3

January 2003

Happy New Year Neubert Staff!!

Once again, Thank you for your support and your participation in this project. I will be administering the post-test this month following the same procedures as the pre-test. If you completed a pre-test, your participation in the post-testing is essential to our data collection. Thank You!!

Accommodations

The following accommodations will help students with hearing loss succeed in your classroom

- **Strategic seating**– remember the front is not always closest to the sound
- **Eliminating background noise** as much as possible
- **Repeat and rephrase**
- **Face student when speaking**-- this projects your voice and allows the student visual access
- **Use the blackboard and other visual aids**- write down directions, homework assignments, key concepts and vocabulary, and daily schedules
- **Shorten time spent listening**- provide breaks
- **Place cooperative groups in a quiet place**
- **Encourage questions**
- **Check comprehension**
- **Make listening fun**

Remember… these things will help all students be successful in your classroom

Hearing Aids and Amplification Systems

Some students with hearing loss may use a hearing aid (s) or an amplification system. Although these devices do not bring the student's hearing back to "normal" they do make sounds louder and more accessible to the student. Hearing aids work best when sounds are at a distance of 3 to 5 feet away. An amplification system requires the teacher to wear a microphone that sends their voice directly to a receiver worn by the student. These devices play and important part in determining a student's success in class.

If you are observing any indicators of hearing loss, refer your student to the school nurse for a hearing test.

Did you know
As much of **60%** of a school day can be spent listening????

Hearing loss needs to be considered on an individual basis
Beware of these common assumptions……

Students with hearing loss……

- ✓ Have the same needs as students known in the past
- ✓ Are visual learners
- ✓ Are skilled lip readers
- ✓ Are fine as long as they sit up front
- ✓ Can always hear me if I have a loud voice
- ✓ Will always ask for help or repetition if they need it
- ✓ Will be aware that they have missed something
- ✓ Will understand, because they said they could hear me

Appendix M

Date: _____ Postintervention Faculty Survey Code: _____

Rate your knowledge of these topics on a scale of 1-4, with 1 being the lowest and 4 being the highest.

	Lowest			Highest
Prevalence of hearing loss	1	2	3	4
Indicators of possible hearing loss	1	2	3	4
Effects of hearing loss on education	1	2	3	4
Good listening environments	1	2	3	4
Accommodations for hearing loss	1	2	3	4

Please circle an answer to the following questions:

1. After participating in the staff inservice and receiving the monthly newsletter I feel my knowledge about hearing loss and its effects on learning has....

Increased Significantly **Increased** **Increased Slightly** **Stayed the Same**

2. The intervention I found most useful was...

Staff Inservice and Newsletters **Inservice Only** **Newsletter Only** **None**

3. I would like to continue receiving a newsletter about hearing....

Yes **No**

Appendix N

Date: _____ Faculty Questionnaire Code:_____

Part I

Form B

Please circle "T" if you believe the statement is true, or "F" if you believe the statement is false.

1. There are three types of hearing loss.	T	F
2. An inner ear infection is often treated with tubes.	T	F
3. Hearing loss is a low incidence condition.	T	F
4. It is easier for a person with hearing loss to understand speech in a noisy place when the speaker is closer rather than farther away.	T	F
5. Using a loud voice helps a person with a hearing loss understand you when you speak.	T	F
6. In lipreading, we learn to "see each sound" and can understand complicated messages even at a great distance.	T	F
7. Hearing loss can come and go.	T	F
8. A hearing aid brings hearing back to normal just as eye glasses bring vision back to normal.	T	F
9. Hearing loss does not impact behavior	T	F
10. Classroom background noise can not be eliminated	T	F

Appendix O

Date: _____ Faculty Questionnaire Code:_____

Part II

Form B

Please circle "T" if you believe the statement is true, or "F" if you believe the statement is false.

1. Students are experiencing fewer ear infections.	**T**	**F**
2. Preferential seating ensures success for the student with hearing loss in your classroom.	**T**	**F**
3. On average, students are engaged in listening activities for at least 45% of their day.	**T**	**F**
4. Working in cooperative groups is difficult for the student with hearing loss.	**T**	**F**
5. Students with hearing loss are visual learners.	**T**	**F**
6. Hearing loss shares characteristics with other disabilities.	**T**	**F**
7. A good strategy is to ask the student with hearing loss, "Do you hear me?"	**T**	**F**
8. Hearing loss can be mistaken for inattention.	**T**	**F**
9. Hearing aids work best at a distance of 3-5 feet.	**T**	**F**
10. A mild hearing loss may effect the development of reading and language skills.	**T**	**F**

Survey Results
Postintervention
Sites A and B

Teacher Self-report of Knowledge

	Increased Significantly	Increased	Increased Slightly	Same
Site A	7	15	4	1
Site B	2	23	6	0

Intervention Most Useful

	Inservice and Newsletters	Inservice Only	Newsletters Only	None	No Answer
Site A	24	3	0	0	0
Site B	24	3	2	0	2

Continue Newsletter

	YES	NO	No Answer
Site A	25	1	1
Site B	28	2	1

N=58
n_a=27, n_b=31

Appendix Q
Questionnaire Results
Parts 1 and 2

Site A Preintervention & Postintervention n= 23

Question Number Pre / Post	Question Type	Statement	% Correct on preintervention	% Correct on postintervention
3 / 7	Prevalence	Hearing loss can come and go. (TRUE)	74%	91%
5 / 1	Prevalence	There are three types of hearing loss. (TRUE)	61%	87%
7 / 3	Prevalence	Hearing loss is a low incidence condition. (FALSE)	87%	96%
8 / 2	Prevalence	An inner ear infection is often treated with tubes. (FALSE)	35%	39%
5 / 1	Prevalence	Students are experiencing fewer ear infections. (FALSE)	91%	91%
1 / 8	Accommodations	A hearing aid brings hearing back to normal just as eyeglasses bring vision back to normal (FALSE)	91%	100%
4 / 6	Accommodations	In lipreading we learn to "see each sound" and understand complicated messages even at a great distance. (FALSE)	52%	61%
10 / 5	Accommodations	Using a loud voice helps a person with a hearing loss understand you when you speak. (FALSE)	70%	74%
2 / 2	Accommodations	Preferential seating ensures the success for the student with hearing loss in your classroom. (FALSE)	48%	57%
3 / 7	Accommodations	A good strategy is to ask the student with hearing loss, "Do you hear me?" (FALSE)	74%	74%

Questionnaire Results

Site A Parts 1 and 2 Preintervention & Postintervention n= 23

Question Number	Question Type	Statement	% Correct on preintervention	% Correct on postintervention
8 5	Effects of hearing loss	Students with hearing loss are visual learners. (FALSE)	57%	65%
6 4	Effects of hearing loss	Working in cooperative groups is difficult for students with hearing loss. (TRUE)	57%	70%
7 10	Effects of hearing loss	A mild hearing loss may effect the development of reading and language skills. (TRUE)	100%	100%
6 9	Indicators	Hearing loss does not impact behavior. (FALSE)	96%	96%
1 6	Indicators	Hearing loss shares characteristics with other disabilities. (FALSE)	91%	100%
9 8	Indicators	Hearing loss can be mistaken for inattention. (TRUE)	91%	96%
2 4	Good Listening Environments	It is easier for a person with a hearing loss to understand speech in a noisy place when the speaker is closer rather than farther away. (TRUE)	61%	78%
9 10	Good Listening Environments	Classroom background noise cannot be eliminated. (TRUE)	70%	60%
4 9	Good Listening Environments	Hearing aids work best at a distance of 3-5 feet. (TRUE)	74%	78%
10 3	Good Listening Environments	On average, students are engaged in listening activities for at least 45% of the school day. (TRUE)	78%	80%

Questionnaire Results

Site B Parts 1 and 2 Preintervention & Postintervention n= 30

Question Number	Question Type	Statement	% Correct on preintervention	% Correct on postintervention
3/7	Prevalence	Hearing loss can come and go. (TRUE)	70%	87%
5/1	Prevalence	There are three types of hearing loss. (TRUE)	67%	73%
7/3	Prevalence	Hearing loss is a low incidence condition. (FALSE)	73%	83%
8/2	Prevalence	An inner ear infection is often treated with tubes. (FALSE)	47%	50%
5/1	Prevalence	Students are experiencing fewer ear infections. (FALSE)	90%	97%
1/8	Accommodations	A hearing aid brings hearing back to normal just as eyeglasses bring vision back to normal. (FALSE)	97%	97%
4/6	Accommodations	In lipreading we learn to "see each sound" and understand complicated messages even at a great distance. (FALSE)	60%	47%
10/5	Accommodations	Using a loud voice helps a person with a hearing loss understand you when you speak. (FALSE)	67%	73%
2/2	Accommodations	Preferential seating ensures the success for the student with hearing loss in your classroom. (FALSE)	77%	87%
3/7	Accommodations	A good strategy is to ask the student with hearing loss, "Do you hear me?" (FALSE)	73%	77%

Site B

Questionnaire Results
Parts 1 and 2 Preintervention & Postintervention n= 30

Question Number	Question Type	Statement	% Correct on preintervention	% Correct on postintervention
8/5	Effects of hearing loss	Students with hearing loss are visual learners. (FALSE)	53%	50%
6/4	Effects of hearing loss	Working in cooperative groups is difficult for students with hearing loss. (TRUE)	63%	83%
7/10	Effects of hearing loss	A mild hearing loss may effect the development of reading and language skills. (TRUE)	93%	100%
6/9	Indicators	Hearing loss does not impact behavior. (FALSE)	100%	100%
1/6	Indicators	Hearing loss shares characteristics with other disabilities. (FALSE)	100%	97%
9/8	Indicators	Hearing loss can be mistaken for inattention. (TRUE)	100%	100%
2/4	Good Listening Environments	It is easier for a person with a hearing loss to understand speech in a noisy place when the speaker is closer rather than farther away. (TRUE)	67%	63%
9/10	Good Listening Environments	Classroom background noise cannot be eliminated. (TRUE)	50%	70%
4/9	Good Listening Environments	Hearing aids work best at a distance of 3-5 feet. (TRUE)	67%	87%
10/3	Good Listening Environments	On average, students are engaged in listening activities for at least 45% of the school day. (TRUE)	67%	63%

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